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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/058,845	01/28/2002	Takefumi Hatanaka	F-7303	3712

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EXAMINER

PATEL, VINIT H

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 06/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/058,845

Applicant(s)

HATANAKA, TAKEFUMI

Examiner

Vinit H. Patel

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 January 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-3, 7 and 8 are rejected under 35 U.S.C. 102(b) s being anticipated by Camacho, US Patent No. 4,181,504.

Regarding claim 1, Camacho teaches providing a Furnace with a hearth (thermal plasma reactor) holding electrically conductive material (electrodes) (C20/L8-10); introducing coal (solid carbon materials) to form plural streams (minute arc passages) (C20/L20-24); Supplying current (electric power) to the electrodes by the plasma torches so as to form a molten layer (discharge plasmas) in the plural streams (C20/L17-35); adding steam to the plural streams to devolatilize the coal to produce raw gas (synthesis gas) which can be further processed in a methanator (containing a methanation catalyst) into methane (C4/L42-68; Figs. 13 & 16).

Regarding claim 2, Camacho teaches supplying feed water to a steam source to form steam at the upstream portion of the reactor (Figs. 1 & 16) and the raw gases are cooled and removed of moisture and the moisture (water) is circulated back to the steam generating zone (Abstract; Figs. 1 & 16).

Regarding claim 3, Camacho teaches controlling the process by temperature responsive control of the power to the arc plasma torches thereby controlling H₂/CO ratio (C20/L29-42).

Regarding claim 7, Camacho teaches an arc plasma reactor 11 having a solid carbon supply port 32, a water port 27 (Fig. 1), an insulated casing (C6/L44) with synthesis gas outlet 18, an arc plasma chamber (C10/L9-33), arc discharge electrodes (C8/L39-68), and a plurality of minute arc passages formed in solid carbon materials in the plasma chamber (C20/L5-52); a feed water supply pump (Fig. 1); a power supply (Fig. 1); and a methanation reactor (C4/L42-68).

Regarding claim 8, Camacho further teaches a condenser unit (heat extractor) and recycle line (Fig. 1).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 4 is rejected under 35 U.S.C. 103(a) as being obvious over Camacho, US Patent No. 4,181,504 as applied to claim 1 above, in view of Yakobson et al., US Patent No. 6,380,268.

Regarding claim 4, Camacho teaches all of the limitations as applied to claim 1 above, but does not explicitly teach circulating a portion of the synthesis gas back into the reactor. Yakobson is a plasma reactor wherein tail gas recycled and fed back into

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the plasma reactor (C2/L16-25), and it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Camacho with Yakobson to include recycling tail gas (synthesis gas) back to the reactor for the purpose to increase hydrocarbon yield and decrease steam required (C4/L34-37).

3. Claims 5, 6 and 9 are rejected under 35 U.S.C. 103(a) as being obvious over Camacho, US Patent No. 4,181,504 in view of Funk et al., US Patent No. 4,545,971.

Regarding claim 5, Camacho teaches providing a Furnace with a hearth (thermal plasma reactor) holding electrically conductive material (electrodes) (C20/L8-10); introducing coal (solid carbon materials) to form plural streams (minute arc passages) (C20/L20-24); Supplying current (electric power) to the electrodes by the plasma torches so as to form a molten layer (discharge plasmas) in the plural streams (C20/L17-35); adding steam to the plural streams to devolatilize the coal to produce raw gas (synthesis gas); controlling the process by temperature responsive control of the power to the arc plasma torches thereby controlling H₂/CO ratio (C20/L29-42); and the raw gas can be further processed in a methanator (containing a methanation catalyst) into methane (C4/L42-68; Figs. 13 & 16), but does not teach detecting H₂ and CO concentrations to produce a current control signal.

Funk teaches producing gas by utilizing a ratio controller in response to signals of product gas concentration (C5/L10-67) and producing a signal (C5/L10-67) and it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Camacho with Funk to provide a signal and controller for controlling arc discharge current that would adjust the electric power to the electrodes to control

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temperature of the discharge plasma for adjusting the H₂/CO ratio that would provide improved control of synthesis gas production (C1/L25-68).

Regarding claim 6, Camacho further teaches supplying feed water to a steam source to form steam at the upstream portion of the reactor (Figs. 1 & 16) and the raw gases are cooled and removed of moisture and the moisture (water) is circulated back to the steam generating zone (Abstract; Figs. 1 & 16).

Regarding claim 9, Camacho teaches all of the limitations as applied to claim 7 above, but does not teach a first detector in the plasma reactor, a second detector in the plasma reactor, a controller, and electric power controller.

Funk teaches a first and second controller in the plasma reactor, a controller, and electric power controller (C5/L10-67) and it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Camacho with Funk to signals and controller for controlling arc discharge current that would adjust the electric power to the electrodes to control temperature of the discharge plasma for adjusting the H₂/CO ratio that would provide improved control of synthesis gas production (C1/L25-68).

Double Patenting

Claims 1, 2, 5 and 7 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-6 of copending Application No. 10/058843. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims 1, 2, 5 and 7 of the instant application recite limitations set forth in claims 1-6 of copending Application No. 10/058843.

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This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vinit H. Patel whose telephone number is (571) 272-0856. The examiner can normally be reached on 9:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


VHP


ALEXA DOROSHENK
PRIMARY EXAMINER